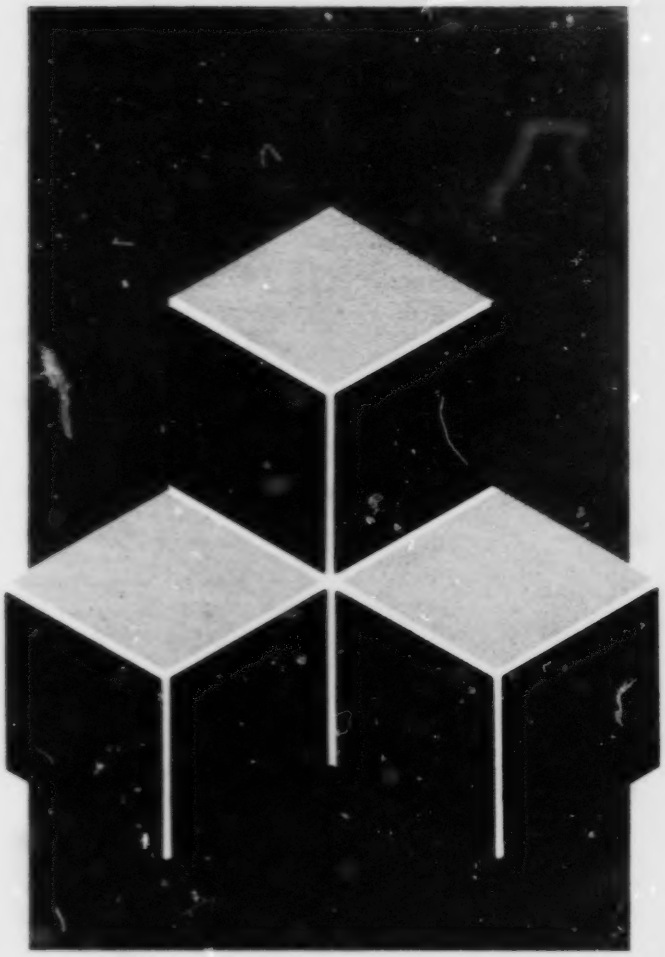
Saskatchewan
Education

Hon. Lorne H. Hepworth
Minister

"A WORLD WITHOUT BOUNDARIES"

A BACKGROUND PAPER ON

DISTANCE EDUCATION



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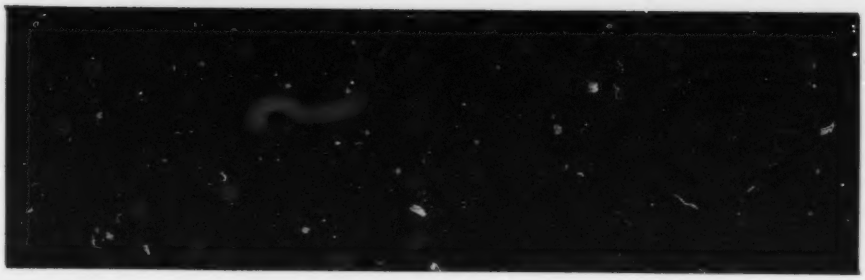

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A BACKGROUND PAPER ON

DISTANCE EDUCATION

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Executive Summary

This issue gained system-wide recognition at an October 22-23, 1986 post-secondary education conference, Leadership 2000, where Distance Education was identified as one of several areas of immediate interest and opportunity. Following this, the Honourable Lorne Hepworth, Minister of Education, undertook twenty Consultation Meetings across Saskatchewan where a range of post-secondary issues were discussed. Again, Distance Education emerged as an area of immediate public interest. On April 28, 1987, the Minister announced the establishment of a Distance Education Council: "To advise . . . on the development of a new network of facilities and programs. It will also be asked to develop a policy on electronic distance education" (p. 10). The establishment of a $3M. Education Outreach Fund was also announced.

This Background Paper is intended to provide information on the electronic and "untraditional" delivery systems of distance education as they apply to Saskatchewan. By so doing, it is hoped that Saskatchewan Education can provide a more complete knowledge base for the development of Distance Education in the province to support the new Council.

The Paper is specifically intended to achieve 4 objectives:
1) familiarize readers with basic terms, methods, programs being offered in the field; 2) provide a focus for the post-secondary system on issues of quality cost-effectiveness, mandate, accessibility, target group and

"attitudinal barriers" in distance education which can be brought to and addressed through the Council; 3) encourage broad interest in the issues as raised here(among others); and 4) bring discussion in this entire area together in a more unified and coherent process where longer-term planning can emerge through the Saskatchewan Distance Education Council for the benefit of all participants -- producers and consumers alike.

The Paper is organized into two parts: I. Background and, II. Issues. This format is intended to facilitate the objectives as outlined. The opportunities presented in the final section of the Paper provide a number of recommendations as follows:

The Distance Education Council, representing K-12 through post-secondary education should:

(a) act as an "operations clearinghouse" for distance education, by:

1. providing a consistent point of contact for federal and provincial departments/agencies, and a working forum to foster and develop distance education within a rational planning framework for Saskatchewan;

2. disseminating the evaluation of findings to provincial stakeholders, collecting information on distance education outside of Saskatchewan, as well as

collecting details on out-of-province programs which are coming into Saskatchewan through distance education modes;

(b) recommending and reacting to policies on distance education, including procedures and criteria for managing the demand on distance education systems into the future. This function of the Council should be informed by reliable/valid assessments of needs, by cost/quality effectiveness evaluations on projects and systems, and by broad input from both producer and consumer interest groups;

(c) encouraging joint marketing through vehicles such as joint university/institute/college calendars and information on distance education programs with input from agencies and stakeholders;

(d) encouraging orientation for interest groups and training for instructors and consumers of electronic distance education to ensure access, quality, and raise the "comfort level" with new technology in distance education for producers and consumers alike; and

(e) advising and recommending on requests from the Education Outreach Fund.

Glossary of Terms Used

Distance Education: a learning process in which the teacher (information source) and the student (learner) are separated by distance, yet have the ability to communicate (interact) with one another, in some cases with other learners (see pp. 3-4).

Teleconference: using telephone system, allows several to be on one telephone network at once.

Video conference: uses video equipment and telephones. The telephone provides audio interaction. Usually, the receiving group sees the presenter on the video (T.V.) screen, the presenter does not see the receiving group. In some cases, there is a video camera at both ends of the transmission and there is full audio and video interaction.

Narrow casting: a controlled signal from one point to another allowing a presenter to direct a signal to one or more specified receiving sites. Broadcasting is not controlled in this way.

SECTION ONE: BACKGROUND

Introduction

Two recent royal commission reports pay special attention to the question of distance education. The McDonald Royal Commission on the Economic Union and Development Prospects for Canada (1985) devotes one chapter to education and training in Canada. Within it, the single area to receive praise is that of distance education. While the primary purpose of the Commission was the economy, in the words of the Commission:

> The provision of television courses, whether satellite or cassette-based, of educational information through on-line home computers, and the supporting use of correspondence material, all constitute noteworthy innovations in providing education to many Canadians who could not otherwise expect to have access to it (p. 754).

They conclude: "We wish to express our admiration and support for those Canadians who have pioneered in these areas, and to recommend that governments continue to underwrite their efforts and encourage the expansion of their work." (p. 754).

The Report of the Royal Commission on Post-Secondary Education in Nova Scotia (December, 1985) points outs: "One of the most frequent complaints (in Nova Scotia) concerned the lack of access to post-secondary programs that is suffered by people who live in areas at some distance from a university or other post-secondary institution" (p. 234). The Report recognizes the initial costs of new technologies for distance education (p. 235), but adds: "Nevertheless, there is great potential in the use of telecommunications technology in distance education, not only for continuing education but also for the education of younger students." (p. 235). They conclude: "The Commission therefore encourages both the universities and the Vocational and Technical Training sub-department to study further the use of technological methods for providing education at a distance" (p. 235).

In section one, this paper looks at distance education in the Saskatchewan context. It suggests a working definition for "distance education" and covers various aspects of distance education methods and learner characteristics as experienced in Saskatchewan. The second section provides a closer examination of four key issues that face the post-secondary system, and goes on to propose a number of options for the future.

As a background paper, the intent of this document is to stimulate thinking and discussion on this important area. It is not intended to bring "closure" to issues or to "test" policies out. If it brings the

post-secondary and education systems closer together in its focus on distance education, or moves the system closer to processes which will bring forth answers, it will have succeeded in its intent.

Definition of Distance Education

The Colleges, Institutes, and University Extension Committee (CIUE Committee), comprised of community college and technical institute principals, senior administrators of the university extension divisions, and senior officials from the Department of Advanced Education and Manpower (now part of the Department of Education), formed a sub-committee in 1984 to address distance education issues. The following definition of distance education was approved in January 1985 by CIUE and has been adopted for the purposes of this paper:

> **Distance education describes a learning process in which the teacher or information source and the student (learner) are separated by distance, yet have the ability to communicate (interact) with one another, and in some cases with other learners.**
>
> **Distance education can be a process which occurs in the home, at the workplace, or in an educational facility. The process can involve both independent studies and group activities.**

Distance education is frequently associated with communication technologies such as telephones, teleconferencing, computer technology, television, or any combination of these technologies. However, more traditional correspondence or independent study programs should not be overlooked since they too fit the above definition and have served many adults well through time.

Distance Education Methods

Educational responsibilities shift when technology serves as the primary method of maintaining human interaction in distance education programs. The learner becomes much more responsible for mastering concepts at a distance from the instructor. On the other hand, when the opportunity for face-to-face interaction is limited, the instructor becomes responsible for assisting the learner to achieve predetermined learning goals, as well as maintaining communications with the learner.

Since distance education shifts a greater level of responsibility to the learner, a high level of motivation is needed to accomplish the learning task successfully. The telephone and teleconferences are frequently used to discuss learning concepts, while other technologies such as the telephone and computerized electronic networks are used for other information-sharing purposes. The various distance education methods and technological applications are summarized in Table I.

TABLE I

DISTANCE EDUCATION METHODS AND TECHNOLOGICAL APPLICATIONS

Method	Format	Vehicle of Delivery
1. Correspondence	Print-based	Mail used
2. Teleconference	Audio-based - usually have supportive printed material	Telephone used
3. Videotape	Sound/Motion - usually have supportive printed material	VCR's and television screen used.
4. Videotex	Print-based on a TV screen	Transmit words (text) by telephone lines
5. Videoconference	Audio/Visual Interactive - usually have supportive printed material	Television used
6. Computer-based CML and CAI	Print-based	Printouts on TV screen (e.g., PLATO system)
7. Videodisc	Audio/visual - interactive with disc - best for learning specific skills	Film type screen used Videodisc player used (Very high storage capacity)
8. Interactive Video	Audio/visual - programmable - usually has supportive print-based material specific skills	Visual screen Videodisc player Computer

Program Characteristics

A flexible curriculum design is appropriate for distance education since it allows the learner to develop an individualized framework for learning. The process of applying various technologies as a delivery support mechanism becomes less difficult when learning objectives delineate the scope and depth of the learning task. By using other support mechanisms such as telephone tutoring, the learner is able to obtain assistance from the instructor when concepts are difficult to comprehend.

Individual styles of learning influence the achievement of educational goals. To meet the individual needs of distance learners, additional reference books, audiotapes and videotapes should be accessible. The occasional group learning activity provides the learner with an opportunity to meet peers, discuss issues, exchange viewpoints, and gain practical experience when the opportunity for face-to-face interactions is limited. As Naisbett has observed:

> Whenever institutions introduce new technology to customers or employees, they should build in a high touch component: if they don't, people will try to create their own or reject the new technology (1984, p.40).

Thus, high "touch" or interaction remains a fundamental element in distance education programs, when face-to-face interactions do not occur on a regular basis. Human interaction of a different nature occurs when telephone tutoring and other electronic communication networks are available on a regular basis. The establishment of peer networks can also promote information exchange. Telecommunications, and a combination of print-based, audio-based, and computer-based media can effectively support the learning process at a distance as well.

Learner Characteristics

Success in distance learning experiences is determined by the learner's self-motivation, independence, and a belief in the credibility of these learning experiences. Many adults are able to approach independent learning with confidence, while others prefer the traditional classroom setting, often because they lack confidence in their ability to approach learning on an independent basis. Thus, the choice between traditional and distance education programs is often hindered by a lack of experience with distance education delivery modes.

Nevertheless, distance education enables adult learners to overcome a variety of barriers to learning such as social situation, geography, physical limitations, and individual styles of learning. Time barriers are commonly experienced by shift workers, employees who travel and seasonal workers. The undereducated adult, isolated homemaker, and the

immigrant may each be restricted by his or her social situation and may be uncomfortable in the traditional classroom setting. Rural area residents are confined by geography because they usually reside beyond the commuting range of an educational institution, and physical limitations prevent some people from attending educational programs at an institutional setting. Many adult learners want to achieve educational goals at their own pace in a manner which complements their individual lifestyles. Distance education can assist the learner to overcome many of these barriers.

A survey of Saskatchewan students who were enrolled in correspondence courses at Athabasca University and the University of Waterloo was conducted (Thompson, 1983) to determine learner characteristics and gather information about individual motives for learning. One hundred and five Athabasca University enrollees as well as one hundred and twenty-two University of Waterloo enrollees responded to a survey questionnaire. The majority of respondents (53.9%) were female with an average age of 32.9 years, over 70% were married, and there were three or more persons living in over half of the households.

In relation to employment status, over 76% of the respondents were employed on either a full or part-time basis, the majority were employed full-time. At both universities, most of those surveyed were employed in professional occupations, nearly 30% had one or more university degrees, and 87.7% had at least some post-secondary education.

More than half of the respondents had moved a minimum of 20 miles from their principle residence at least once within the previous two year period; approximately one third of the respondents intended to complete a university degree at some time in the future.

More than fourteen percent of the respondents from Athabasca University and 15.6% of the University of Waterloo respondents indicated they would pursue full-time university enrollment within the next three years and one fifth of the respondents were concurrently enrolled at other educational institutions in Saskatchewan.

The factors which motivated correspondence students to undertake further studies included a broadening of general knowledge, obtaining a university degree, gaining career advancement, and updating professional skills. Enrollment in specific courses was also motivated by a variety of factors including the reputation of the university, the course starting times, the work pace, the absence of formal entrance requirements, and the transferability of course credits to other universities.

The "State of the Art" in Saskatchewan

At present, Saskatchewan residents are taking advantage of a wide variety of distance education offerings from institutions located outside of the province. In A Study of Saskatchewan Students Enrolled

in Athabasca Correspondence Programs and University of Waterloo Correspondence Programs (Thompson, 1983), it was reported that during the 1982-83 academic year, 126 Saskatchewan residents had enrolled in the University of Waterloo Correspondence Program.

Since 1984-85, several Saskatchewan Community Colleges (now regional colleges) including Northern colleges, established working agreements with Athabasca University in Alberta. Further, a number of College regions in the province have a working agreement with the University of Oregon to provide a Masters Degree in Education using itinerant professors. Current college discussions with such "outside institutions" now include doctoral programs in education, an MBA program, and graduate level classes in Social Work.

It is not possible to estimate the total number of Saskatchewan residents who have taken the initiative to enroll in the vast variety of correspondence distance education offerings available to Canadians. Course offerings are listed in Learning at Home, Distance Education Courses in Canada, 1985, a standard counselling resource used by Community Colleges in Saskatchewan.

Saskatchewan post-secondary institutions have a number of their own distance education programs but these are not systematically organized or co-ordinated on a provincial basis. Rather, the programs are

conducted independently in reply to local needs. At no point is the entire mix of classes rationalized, or even fully known by either the entire post-secondary education system or the public.

Therefore, the Department of Education in conjunction with the post-secondary and k-12 education institutions in the province will need to see beyond rigid boundaries in the field of distance education to visualize and manage a world without boundaries. Only new ways of cooperating can bring the entire system together to meet this challenge. Some of the immediate examples of the pressing need are: (1) the need for systematic credit transfer processes; (2) the provision of broad-based public information; (3) need for the sharing of evaluation results and needs assessments; (4) the willingness to rationalize Saskatchewan programs with "outside" courses, and (5) the rational management of various course "mixes" at the community level, to name but a few.

Little evaluation exists in the province on educational effectiveness and quality in Saskatchewan distance education classes. Those factors which influenced course withdrawals at Athabasca University included

having insufficient time for studying, job and family responsibilities, and health problems. In addition, the Waterloo group indicated that course content did not meet expectations. Some courses were also perceived to be too difficult. These results demonstrate the need for accessibility to career counselling and other support services in distance education programs.

The results of this survey, then, reflect how distance education opportunities can assist the adult overcome a variety of barriers to learning and the various motivations which Saskatchewan adults have for obtaining further education.

Applications of Distance Education Technology in Saskatchewan

A considerable body of knowledge and expertise has developed within Saskatchewan as distance education activities have diversified and expanded in recent years. Several program formats have been pilot tested and are under evaluation at present. In addition to the traditional correspondence education programs, teleconference, videoconference, satellite, and computer-based programs have been delivered within the province. Highlights of some distance education activities in Saskatchewan's post-secondary education sector are presented in Table II, following, spanning the period from 1982 to 1985.

Table II
HIGHLIGHTS OF SASKATCHEWAN DISTANCE EDUCATION ACTIVITY
1982-85

INSTITUTION	PROGRAM	TECHNOLOGY USED	BROKERING INSTITUTION
Kelsey Institute	Personal Development Worker Program	Teleconference	1982-85. Prairie West Community College has co-ordinated the delivery of 3-4 modules per year to learners throughout Saskatchewan.
Wascana Institute	Nurse Refresher Program	Print based, computer managed learning.	1984-85. Cumberland, Prairie West, Southeast Community Colleges; Saskatoon, Regina, 70 students. 1985-86. Mistikwa, Cypress Hills, Parkland Community Colleges; Saskatoon, Regina, 100 students.
University of Regina	8 credit programs, 4 per semester	Interactive Video via fibre optics network.	1985-86. Five off-campus sites in 4 Community College regions: Coteau Range, Cypress Hills, Parkland, and Southeast.
University of Regina	Indian Administration Program	Teleconference	1985-86. Indian Reserves at Fort Qu'Appelle and Red Earth.
University of Saskatchewan	25 full course equivalents	Correspondence	N/A
University of Saskatchewan	Continuing Medical Education	Teleconference	1984-85. A consortium of the Colleges of Medicine, Nursing and Pharmacy teleconference to thirteen locations.
University of Saskatchewan	Uplink '84 became "STELLA," Sask. Telelearning Assoc. Inc.	Interactive Video via satellite.	Uplink '84, satellite project, 40 hours of programming broadcast across Western Canada. City of Prince Albert distributed signal via cable network. In 1986-87, 153 program hours are planned.

Following is a brief discussion of some of the carriers and systems used in distance education to date:

1. Correspondence and Teleconference Programs

Correspondence as an educational delivery system has been used by educational institutions since the 19th century. The Saskatchewan Correspondence School, established in 1925, reaches both adults and children. In fact, approximately 40 per cent of the enrolment is comprised of adults. One major drawback is the level of personal self-discipline required. Attrition rates on correspondence courses may exceed 70 per cent.

Several university and technical institute credit programs as well as upgrading programs in the health professions have employed teleconference technology. Although some problems have been experienced, such as telephone disconnections and poor signals, the technological services have been rated favorably by the post-secondary education sector (Thompson, 1985). The major drawbacks to expanding the utilization of this technology are the significant line and service charges. In the view of educational institutions, teleconference costs appear to be similar to the costs of using on-site instructors for program delivery. In the view of the learner, costs in time, money, and convenience are significantly reduced through the use of this technology (Thompson, 1985).

2. Videoconference Programs

The University of Regina has used one-way video and two-way audio technology via Saskatchewan's fibre optics network for the live transmission of lectures from a campus classroom to other program sites. Moose Jaw, Swift Current, Yorkton, Weyburn, and Estevan are participating in the third year of this pilot project. Direct dial telephones enable the learners, as a group, to interact with the instructor, ask questions, and receive feedback. Videotapes are made available simultaneously with the broadcast and later can be delivered to remote program sites.

It is anticipated that enhanced interaction with the program sites will occur in the future with the addition of a specialized control unit. The benefit of the videoconference learning approach is that learners at distant centers can become actively involved in the classroom interaction.

3. Satellite Television Programs

In 1983, the University of Saskatchewan obtained funding from the federal government to conduct an experimental satellite project. "Uplink '84" provided interactive educational programming in the four western provinces. Professional upgrading programs in veterinary medicine was the major programming area at that time.

Since, a consortium named the Saskatchewan Tele-Learning Association, "STELLA," has been formed, based at the University of Saskatchewan, composed of some 20 organization users in a not-for-profit corporation which is testing the effectiveness of satellite program delivery in Saskatchewan. It is currently taking advantage of a "seat sale" on the ANIK satellite and has recently decided to extend its pilot for another year, past June 1987. So far, short programs are mainly what have been tried but longer term credit classes are planned for Fall 1987.

Virtually any provincial location with a satellite-dish can receive satellite transmission. Through satellite, distance education in Saskatchewan can be part of Western-Canadian, Canadian, or even North American program networks. It opens the door to inter-provincial consortia as well, an important point since satellite transmission has been used extensively in provinces such as Alberta and B.C.

A current interprovincial agreement on distance education permits an exchange of materials in Western Canada at minimal cost. The ANIK "footprint" covers most of the prairies, thus, interprovincial cooperation and Western consortia delivery is a real potential through satellite.

4. Computer-Based Programs

An example of computer-based distance education is the PLATO delivery system established at Regina Plains Community College and Saskatoon Region Community College in April, 1985. PLATO supports individualized, criterion-based curricula and has been successful in the adult basic education programs in these two colleges. Each college's classrooms were equipped with 12 computer work stations able to accommodate 48 students. Basic academic skills and life skills can be supplemented by PLATO. The December, 1986 Saskatchewan Skills Development Program Final Report found that, despite the lack of flexibility of these computer programs: "The PLATO staff ... are committed to the system, having felt free all along to subject both the software (learning modules, diagnostic tests, etc.) and the overall system to critical assessment" (p. 36).

Wascana Institute of Applied Arts and Sciences offers a distance education professional retraining program for inactive nurses throughout Saskatchewan. The program utilizes computer-managed learning for the testing of theoretical concepts and record-keeping of the individual test scores. Regularly scheduled telephone tutoring is used to support the learning process; practical skills are reviewed at centralized laboratory classes in Regina and Saskatoon. Additional reference books and videotapes of critical

nursing skills are provided at each program site. Clinical practice is gained at regional accredited hospitals where volunteer general duty nurses are trained to function as clinical preceptors (i.e., volunteer duty nurses) to guide, supervise, and evaluate clinical performance. The program has been offered at Regina and Saskatoon and the outreach sites have rotated from Estevan, Kindersley, and Melfort during the pilot project in 1984, to Melville-Yorkton, North Battleford, and Swift Current in the fall of 1985.

Saskatchewan Communications Advanced Network (SCAN)

Background

In a 1984 White Paper developed by the Communications Policy Secretariat, SCAN was described as a "network" proposed to carry a variety of new communications services to the public, including educational/cultural television, telephone teleconferencing, and computer networks. SCAN was to use the provincial telephone system and the fibre optics cable network to serve 52 communities, or 60% of the population. Teleconferencing would be a further province-wide feature. A series of public meetings were held across the province in 1984 and a feasibility study prepared for government and submitted in 1985, Spring.

The above network envisions:

(1) Specialized cable television service from Regina and Saskatoon to 52 communities;

(2) Telephone teleconferencing to provide a two-way service province-wide and a combined T.V./teleconference service in 52 communities;

(3) An information data - network to be accessed by specialized computer equipment;

(4) The Task Force Report in April included microwave transmission to reach La Ronge (fibre optics is possible only in the south);

(5) Use of the SaskTel satellite in Regina on a needs-basis was also included.

It was proposed in the White Paper that data access terminals, television monitors and telephone conferencing equipment "could be supplied" at "SCAN centres" in selected communities out of the 52 to be served by fibre optics. Thus, fibre and telephone teleconferencing to 52 communities, teleconferencing province-wide, microwave to La Ronge, and satellite as needed would begin a network of advanced telecommunication service in Saskatchewan. The long-term vision was to use satellite more through time for television distribution as satellite becomes more widely used. The status of this proposal to government is still under review. Meanwhile, the Department of Education has undertaken a number of initiatives in this area, as discussed earlier.

Conclusion

The potential for distance education and its impact on the delivery of educational services in Saskatchewan has only just begun to be realized. Skill retraining and upgrading programs, general interest classes and seminars, specialty and continuing education programs, credit and non-credit university courses, even meetings can be adapted for presentation in a distance education format. By utilizing distance education methods, geographical boundaries become irrelevant and accessibility to educational opportunities improves.

SECTION TWO: ISSUES

The Problem

The questions which must be addressed by government and the post-secondary system in Saskatchewan are not whether distance education is a desirable teaching-learning mode for rural, remote, the homebound, or learners who cannot (or choose not to) access the traditional system. Distance education is a proven delivery system. The central question is not whether Saskatchewan has the best technology today to build on, nor is it whether or not Saskatchewan can afford to begin funding "best technologies". Saskatchewan's post-secondary system is now utilizing satellite and fibre optics transmission, including transmission of

computer-based education. It has also been using print, audio and video cassette materials for some time. The efficiencies and effectiveness of these distance education systems have been well demonstrated by the universities, institute, colleges and the Department of Education's Saskatchewan Correspondence School.

From the viewpoint of the Department of Education, the central questions which must be addressed include:

(1) To what extent will the post-secondary system, together with government, be willing to accept this major challenge for change? Can a future which will defy geographic boundaries -- from regional mandates, to provincial jurisdictions, to international boundaries -- be envisioned and prepared for? Can university professors and institute instructors see themselves teaching to cameras? Can systems of K-12 and post-secondary education, which have relied on geographic boundaries -- real or understood -- rest easy with out-of-province programming being telecast into their regions? Can government endorse interactive media which puts communities in direct contact with international teaching institutions without first determining whether they meet provincial standards or not? And, if the questions can be envisioned, how will the answers be formulated in the midst of a new era of direct access to adult education through high technology?

(2) Does the post-secondary education system, together with government, have the cooperative will to launch into new, highly interdependent, bi-lateral and multi-lateral ventures? Will our post-secondary system, which have historically cooperated either out of agreements or out of structural interdependence, move to an era of proactive joint-planning? Can they move to new levels of resource sharing and to shared needs identification? How can individual projects and jurisdictions expect to move ahead together into a future which will have very different rules from the past?

(3) Finally, in a period of restraint in the provincial economy, how can the joint will of government and the post-secondary education system collectively manage distance education so that it does not create a proliferation of demands and expectations when current needs are difficult to meet? Can it be managed to meet priority needs to avoid exacerbating a system already under stress?

Meeting and overcoming challenge is not a new phenomenon in Saskatchewan. While today's distance education challenge may seem almost insuperable at face value, taken in context, there is every reason for optimism. The history of adult and continuing education in Saskatchewan is one of pragmatism and cooperation. Saskatchewan has long been recognized for its mastery of decentralization in the field of education.

The Lighted School Program in the mid-1940's was an early example of community-identified, community-based adult education. Day schools became "lighted" adult night schools across rural Saskatchewan.

With the University of Saskatchewan's agricultural extension services, higher education was decentralized and taken directly to the communities of the province. With the growth of the institute extension departments and the introduction of community colleges in 1973, decentralization became a way of life in Saskatchewan.

Today, with one major institute, two universities, and eight community colleges, post-secondary education is very much an interdependent enterprise. The Saskatchewan Skills Extension Program extends the delivery of vocational/technical programs from the institutes to the colleges; university credit classes are delivered through a community college-university delivery contract agreement; the examples of joint delivery are numerous, both on a system-wide basis, and on an individual institutional basis.

The pioneers of the 1990's in adult education and vocational/technical training will be those who meet the challenge of technological change. The challenge of distance education is the test of whether the spirit of increased co-operation will direct adult educators towards broad working systems for the mutual benefit of the systems and learners alike. These are not simply "theoretical" questions, they must be addressed and can only be answered by those to be involved.

The Issues

With this background, a minimum of four issues need to be addressed initially:

(1) How do the cost and quality benefits compare with current delivery systems? What technology, or mix of technologies, suits Saskatchewan's needs?

(2) What mandate implications does distance education hold for the post-secondary system?

(3) Are the current systems of delivery truly providing province-wide geographic access to post-secondary education, and secondly, if distance education promises access, can we reasonably assume that all segments of society will respond to it?

(4) What attitudinal barriers exist which may impede finding the answers to the above questions, as well as to unasked developmental questions into the future? What mechanism(s) can be found to facilitate reasoned, multi-lateral decision-making?

Quality and Cost-Effectiveness

Finding the best mix of high-tech carriers and traditional delivery methods for distance education is a major consideration for distance education delivery in Saskatchewan. The current options in Saskatchewan

are fibre optics broadband network, satellite transmission, the telephone system, and computer-based systems in high-tech. The strengths and limitations of each system will be outlined.

The fibre optics broadband network in Saskatchewan is owned and operated by Saskatchewan Telecommunications (SASK TEL). It would appear to have the capacity to carry much of the distance education service which is likely to be required in the area it reaches. The network can carry audio-teleconferencing, educational television, information data banks, computer assisted and/or computer managed instruction. At present, the fibre optics broadband network links 52 major communities and reaches approximately 60 per cent of the province's population. However, the figure moves closer to 75 per cent if a half hour driving radius (ie. 30 Kilometers) around each community is considered. The potential of using fibre optics for La Ronge is possible only if a microwave relay station is added to carry the signal beyond the fibre system. Since the fibre line cannot be buried underground in the north, there is no fibre optics potential for the north.

Table III indicates the distribution of the communities linked in the SASK TEL fibre optics broadband network by community college region. Community college regions such as Parkland, South East, and Prairie West have more communities linked to the fibre optics network

than other regions, creating a disproportionate spread of distance education opportunities via this network today. This disparity may never be entirely corrected through fibre optics where certain remote rural regions are concerned.

TABLE III

COMMUNITIES LINKED TO THE SASKTEL FIBRE OPTICS BROADBAND NETWORK BY COMMUNITY COLLEGE REGION

Community College	Central Offices	Number of Communities on the Fibre Optics Network
Carlton Trail	Humboldt	5
Coteau Range	Moose Jaw	3
Cumberland	Nipawin	5
Cypress Hills	Swift Current	4
La Ronge Region	La Ronge	0
Lakeland	Lloydminster	0
Mistikwa	North Battleford	2
North East	Creighton	0
Parkland	Melville/Yorkton	10
Prairie West	Biggar	7
Prince Albert Region	Prince Albert	3
Regina Plains	Regina	2
Saskatoon Region	Saskatoon	3
South East Region	Weyburn	8
West Side	Beauval	0
TOTAL		52

A second possible limitation to the use of fibre optics in the delivery of distance education is the limited ability of the post-secondary educational institutions to afford existing service rates. In November of 1985, a telephone survey of the colleges, the institutes, and the two universities was conducted by the Department to determine the level of distance education activity in the post-secondary education sector, and

the level of SASKTEL services. It was evident from the survey results that the University of Regina possessed the most experience in the use of the fibre optics network for distance education delivery. Although the service unit of SASKTEL was generally praised for prompt, efficient, cooperative service and for well-maintained equipment, there was a reoccurring problem in affording the service. This was seen as the most significant limitation of SASKTEL services. The recurring response to the question, "Outline the limitations of SASKTEL's services in distance education activity," was, in aggregate, the high line charges and rates for educational use. The survey indicated the difficulty that community colleges, in particular, have in meeting the current line charges. Two case studies, one at the University of Regina and one at Wascana Institute of Applied Arts and Sciences in Regina reveal a different story, however, which will be presented as a case study of cost-effectiveness.

In the 1985-86 Fall and Winter distance education classes delivered by the University of Regina in cooperation with local colleges via video teleconferencing, a saving of 50 per cent on course delivery was realized. This compared positively with the alternative of using itinerant professors. For Arts, Social Sciences and Administration credit classes, ranging from History 100 to Admin 200, the total estimated net cost was $2,063. per course section using fibre optics. To offer the same eight courses with itinerant faculty, the estimated

net cost per course section was $4,128. (calculations are presented in Appendix A). This breaks down to a $246. net cost for each of the 420 students, or half the cost with fibre optics, in comparison with the traditional delivery method. However, this saving was realized after an initial $36,000 capital investment by the University of Regina for a broadcast studio equipped to minimum standards and it excludes the single ongoing cost for a student technician at $3,200. for two semesters.

According to the University of Regina, the cost of off-campus fibre optics course delivery is only marginally higher, if at all higher, when compared to the costs of mounting the same classes on campus. The major variables include overhead cost and building depreciation. With the elimination of travel expenses, the costs and revenues between fibre optics off-campus classes and on-campus classes have become comparable in terms of today's costs.

On a quality of education level, the distance education mode is more "forgiven" for its limitations than is traditional face-to-face instruction. Few graphics, undersized T.V. monitors, limited training for instructors and overall reduced interaction in small group instruction typically becomes excused as "new technology." To deliver state-of-the-art distance education through fibre optics, slow scan equipment, "electronic blackboards," large screen monitors, portable libraries and the like may all need to be added through time.

In a second case study, the cost-effectiveness of a professional retraining program was successfully demonstrated in the pilot project computer-managed Nurse Refresher Program which was operated during 1984 by the Department of Advanced Education and Manpower. The program was developed at Grant MacEwen Community College in Edmonton and was brought to Saskatchewan in cooperation with MacEwen College and the Alberta Department of Advanced Education, under the auspices of the Interprovincial/Territories Distance Education Agreement mentioned earlier.

A theoretical review of nursing concepts was supported by local tutors using the telephone, and a clinical practice component was provided for the learners. General duty staff nurses at accredited hospitals with more than fifty beds volunteered to function as preceptors to guide, supervise, and evaluate student performance during the clinical learning experiences.

The outgoing cost per student was $1,345. which compared with the average cost of $1,331. for in-house technical institute refresher programs during 1982 and 1983. This average was taken on the basis of the cost per student at Kelsey Institute in 1982, at $1,753; $1,257 at Kelsey Institute in 1983; and, $982 at Wascana Institute during 1983. Saskatchewan did not need to contribute to the program development costs because the Interprovincial Distance Education Agreement promotes the sharing of resources between the four western provinces and territories to reduce the need for duplication.

Additional benefits were also derived from the implementation of a distance education format. A greater proportion of students (47 per cent) came from rural areas of the province, and expenses for relocation were eliminated. As a result of the derived benefits and comparable program delivery costs, the distance education program has replaced both in-house institute refresher programs. Province-wide operation of the program has been assigned to Wascana Institute.

In order for the SASKTEL fibre optics broadband network to become a fully accessible carrier for distance education in the province, two areas need to be addressed:

1. A means to assure a degree of accessibility to distance education offerings for the approximately 25 per cent of province's population which is not within easy driving distance to the fibre optics network in the south. Northern transmission simply is not possible with fibre and this problem needs addressing.

2. Avenues to achieve cost-efficiencies which would make the fibre optics network costs more affordable for the smaller post-secondary education institutions such as smaller schools and regional colleges. This includes telephone line hook-up charges and associated costs as discussed above.

Satellite transmission offers a second carrier option for distance education delivery. The major strength of satellite delivery would be

that virtually any location equipped with a receiving dish could be reached. By satellite carrier, Northern Saskatchewan, a small rural village, or a farm site could access a distance education program offering. Experimentation with the satellite carrier mode of distance education delivery has been piloted by the University of Saskatchewan in a series of "Uplink" projects which have now come under the auspices of a not-for-profit consortium STELLA -- the Saskatchewan Telelearning Association, Inc. This project was to have been a pilot running until June of 1987. The Board of STELLA recently decided to extend it for one more year, however. At this time, no conclusive cost-effectiveness data has been derived from this pilot project.

The major concern in selecting satellite transmission as the major carrier for distance education is the ongoing costs. In a rate schedule published by TELESAT Canada, one dedicated channel service for a full year, without discounts, during 1987 would cost over $1,000,000.00. In addition to the cost of the satellite channel, the following costs would be incurred: program production, administrative costs to operate an educational channel, staffing, receiving sites and equipment. Thus, like fibre optics, transmission cost is a major question for smaller institutions. For these reasons, broad cooperation (or consortia) has been the preferred route for satellite program delivery. In regions such as the Maritimes, several provinces have come together to make satellite transmission a reality.

At this moment, satellite programming is now being transmitted from British Columbia, Alberta, Ontario, the Maritimes, and the United States. The signals will by-pass Saskatchewan unless a satellite "downlink" capacity is in place. Saskatchewan will not be "plugged into" the global transmission network without some satellite downlink capacity and will not be able to transmit without an uplink capacity -- such as STELLA in both cases.

For satellite transmission to become the major carrier of distance education programming in Saskatchewan, two requirements must be met:

1. An injection of dollars for the long-term establishment of a satellite delivery system, or reduced transmission cost through cost-sharing;

2. A provincially coordinated administrative structure for distance education delivery to maximize the use of the satellite delivery system.

Institutional Mandate

The Saskatchewan post-secondary education system has evolved under four Acts and their respective regulations: The University of Saskatchewan Act, The University of Regina Act, The Community Colleges Act, and, for the technical institutes, the powers as vested in the former Department of Advanced Education and Manpower Act (under review at time of writing).

The current university policy respecting university off-campus programming is reflected in the colleges - universities contract for off-campus delivery, originally signed in 1974. The contract refers to the "primary obligation of the University of Saskatchewan and the University of Regina to make (within their means) degree credit programs available to Saskatchewan residents who qualify for and seek such services ..." (p. 1). Besides the credit class "primary responsibility," non-credit activities and additional services such as consultative and information services are also referred to as university obligations.

The three areas named are consistent with the University of Saskatchewan's tradition of providing extension services, and with the significant off-campus programming which has been provided by the University of Regina through the 1970's and 1980's.

Regional colleges have to provide adult education programs and services either indirectly, in co-operation with existing adult education agencies, or directly in order to meet the particular needs of the adults in their regions. The current university - colleges contract effectively makes colleges "brokers" of university programs. The colleges are responsible for determining local needs, assessing the appropriateness of programs, and identifying program types, locations and the numbers of university classes. Universities, within their means, provide credit as well as other non-credit and educational services. Cost-sharing and questions of cancellation of classes are joint decisions.

The formal working relationship between the universities and colleges is over twelve years old. While not without occasional managerial and cost problems, from the viewpoint of both systems, this agreement has been a model for community-based, decentralized delivery of higher education in Canada.

The technical institutes have established a similar delivery model which uses the colleges as "brokers." The major difference arising with the introduction of the Saskatchewan Skills Extension Program (SSEP) in 1983, which enlarged and reshaped the earlier Outreach training program, is that the (then) Department of Advanced Education and Manpower added resources and personnel for program implementation purposes. Today, SSEP is coordinated out of the Training Coordination Branch of the Department of Education's Training Division to enhance the decentralized delivery process of vocational and technical training classes. Again, while not without infrequent funding and operational pressures, SSEP is another example of a model of decentralization in Saskatchewan.

Thus, through colleges, the local community has direct input to almost all of the significant program delivery decisions for both technical-vocational and university-based classes across the province. The community colleges, as brokers, are the central link for decentralized delivery within Saskatchewan. The clearly defined community college regions, local volunteer contact committees, local boards, local evaluations, use of local facilities and instructors are

the foundation of decentralization in the post-secondary education sector today.

However, in light of distance education technologies, it is not clear how long these arrangements can be sustained into the future. The past five years have seen colleges meet local needs by shifting to an increasing number of out-of-province universities which, in turn, provide a greater range of courses through the technologies of distance education. However, today's regional colleges will need to make a concerted and unified effort to co-ordinate the distance education programming to their regions through co-operative mechanisms, which do not now exist for distance education, to enhance their role as "bridging institutions," (as described in SCCTA's A Better Tomorrow, 1986).

Distance education technologies introduce a global "free market" of learning opportunities which observe no boundaries, no classroom numbers, no provincial agreements, and no traditions. As the next century approaches, universities, the new Saskatchewan Institute of Applied Science and Technology, and the regional colleges will all need to become collective brokers of out-of-province programs. The level of co-operation and information sharing will need to increase as more out-of-province program transmission is received by more Saskatchewan citizens. It will fall to the Saskatchewan universities, the Institute, and colleges to be a "base" and a clearing-house on standards and transfer issues. No doubt colleges will still remain the single best

identifier of local teaching and resource expertise and economies of scale will encourage participation of local institutions. But, unless the province pulls together, it is possible that the 1970's and 1980's may one day be looked back upon in history as the "Golden Age" of boundaries, agreements, and cooperation in the post-secondary education sector within Saskatchewan.

Leadership for the future cannot come from legislation and government mandates alone. Leadership must come from the post-secondary education system and government together, if the system is to have a say in its destiny into the future.

How Accessible is the Present System?

Accessibility to post-secondary education opportunities and accreditation transferability are key issues in distance education for Saskatchewan. How accessible are post-secondary credit training opportunities to the people of the province? Table IV describes the current degree of access which Saskatchewan residents have to university and technical institute off-campus credit courses.

TABLE IV

UNIVERSITY OF SASKATCHEWAN AND UNIVERSITY OF REGINA
OFF-CAMPUS OFFERINGS 1985-86 BY
COMMUNITY COLLEGE REGION

Community College	University of Saskatchewan (Full course equivalents)	University of Regina (8 credit class equivalents)
Carlton Trail	3	3.5
Coteau Range	2	14
Cumberland	2	1
Cypress Hills	0	10.5
La Ronge Region	0	1
Lakeland	1	0
Mistikwa	11	1
North East	0	0
Parkland	13	10
Prairie West	4	3.5
Prince Albert Region	34.5	3
Regina Plains	0	Campus
Saskatoon Region	Campus	0
South East Region	0	12
West Side	0	0
TOTAL	70.5	59.5

Table IV indicates that during 1985-86, university credit programs were virtually not available to residents of northern Saskatchewan living within the boundaries of the West Side, La Ronge, and North East Community College regions. Secondly, the table shows that opportunities for accessing university credit programs in the Carlton Trail, Cumberland, Lakeland, and Prairie West Community College regions were limited.

The following factors have contributed to the current situation of limited access to university off-campus credit programs for particular rural and northern areas in the province:

1. Budget restraints at the University of Saskatchewan and the University of Regina.

2. The existing contracts between the Saskatchewan universities and their instructional faculty staff whereby instructors voluntarily accept off-campus teaching assignments.

3. The existing universities/colleges contract which requires that a community college pay to the host university an amount equal to the total registration fee for fifteen students per class. And, in addition, instructor travel, maintenance, and facility renewal. Universities, however, lack the capacity to do more than try to meet costs on each course and, across the board, subsidize total programs while having little control over the management or quality control on the classes. Financial restraints experienced by Saskatchewan Community Colleges and both universities have reduced the ability to offer university programs overall. Recently, two year Arts and Sciences classes were initiated at Prince Albert through the University of Saskatchewan's Extension Department. The University of Saskatchewan also recently announced the same services for Yorkton and North Battleford. These decisions have

created a further perceived inequitable distribution in off-campus programs among the 16 community colleges.

The introduction of the Saskatchewan Skills Extension Program in 1983 has addressed the provincial need for off-campus technical/vocational programs to a limited degree. Table V lists the Saskatchewan Skills Extension Program Training Schedule for 1985-86 by community college region. It is evident that some areas are served significantly better than others, although each rural area of the province (as determined by community college boundaries) receives access to some level of off-campus credit vocational training.

TABLE V

SASKATCHEWAN SKILLS EXTENSION PROGRAM TRAINING SCHEDULE
1985-86 BY COMMUNITY COLLEGE REGION

Community College	Weeks of Training	No. of Programs	Student Capacity
Carlton Trail	115	8	101
Coteau Range	75	8	94
Cumberland	68	5	62
Cypress Hills	121	8	108
La Ronge Region	224	6	82
Lakeland	72	2	87
Mistikwa	115	6	70
North East	145	8	93
Parkland	244	9	118
Prairie West	14	2	30
Prince Albert Region	270	13	184
Regina Plains	11	2	30
Saskatoon Region	21	2	24
South East	197	12	147
West Side	129	6	62
TOTAL	1,821	97	1,292

Since 1983, the SSEP has annually delivered approximately 100 credit vocational programs off-campus throughout the province. However, the demand far exceeds the financial capability to deliver the program. The vocational training needs of rural and northern Saskatchewan residents, which were identified by the Saskatchewan Community Colleges in 1985-86, exceeded 200 program requests. The new Saskatchewan Institute of Applied Science and Technology, together with the new regional colleges, will undoubtedly need to consider increased use of distance education vehicles.

However, in order to address the issue of accessibility to credit programs at the university and vocational/technical level in Saskatchewan, the post-secondary education system, as a whole, must deal with at least the following issues:

1. the capacity to offer credit programs which can feasibly be delivered to residents of the province, irrespective of location -- how many, in which disciplines, can be provided annually;

2. the procedures which can guarantee a minimum level of credit programming access to residents, as groups or individuals, regardless of location;

3. a credit transfer and counselling capacity to simplify the current programs for students off-campus; and

4. evaluating and establishing a distance education means of delivery for these credit offerings where feasible.

Who is Served and Who Will Be Served

The data given earlier (Thompson, 1983), based on one hundred twenty-seven students, indicate that the profile for a Saskatchewan learner in distance education enrolled in Athabasca University and University of Waterloo classes -- variously using print, tele-conference, audio cassettes -- in 1982-83, was as follows:

> Female; between 32 and 34 years of age, married with a least one child; employed on a full-time basis in a professional capacity; prefers to have flexibility in scheduling study time; combines family, work and educational responsibilities; has previous experience with post-secondary education; and, undertakes further education for personal, vocational, or academic reasons. (Thompson, 1983, p. 15).

Other outcomes included: 26.7 per cent Athabasca enrolled intended to complete a Bachelor of Administration degree, 23.8 per cent Waterloo enrollees said they would complete a Bachelor of Arts degree. It is interesting to note that 32 per cent of the Waterloo group had previously withdrawn from other Waterloo courses, 18 per cent from the Athabasca courses and 12 per cent and 7 per cent respectively had withdrawn from other universities' correspondence classes.

These data suggest that distance education enrollees are typically highly motivated, educated at the post-secondary level and attempting to fulfill personal, vocational or academic goals. The fact that the profile reflects females with children employed full-time, would suggest that high motivation is indeed a quality in these learners. Unfortunately, no distance education data exists in Saskatchewan on target groups such as those with low education levels, the unemployed, or on minority groups. Experience thus far has shown that high motivation, together with the confidence to engage in non-traditional learning modes, is a common characteristic of distance education learners in the various delivery systems discussed.

Therefore, in the early stages of provincial involvement with distance education, it is reasonable to expect that those with the characteristics mentioned will continue to be the most willing to come forward. Thus, "access" for distance education purposes, at least in the foreseeable future, may well mean providing access for those interested in continuing professional education, in various trades training deemed suitable for distance education, in various university arts and sciences courses and, as costing may permit, in various non-credit workshops, seminars and the like for those who, again, have high motivation. These programs will require enhanced levels of support and counselling networks to keep attrition at a minimum. To reach groups less motivated and/or less at ease with the technologies may well require substantial support systems. This may mean distance education

as a support to existing systems. It is suggested that carefully considered needs analyses and pilot testing be conducted in this area before major funding is considered.

Attitudinal Barriers

The attitude of many educators and adult learners in Saskatchewan towards distance education initiatives has been to view distance education as a "second-best" option. In the past, the preferred method of adult instruction and learning has been the "face-to-face" method where the instructor and learner are able to meet and interact. Traditionally, education has been a social and highly interactive process and people are unaccustomed to learning via a teleconference or televideo format. The Royal Commission on Post-Secondary Education in Nova Scotia stated:

> Suggestions for improving distance education frequently stressed the use of the latest communications technology. Early objections to courses delivered by such means, founded on the justifiable concern that viewing an image on a screen was not a satisfactory substitute for discussion with a living teacher, may have been partly, but not wholly, resolved with the introduction of interactive telecommunications (p. 235).

Among instructors and adult learners, an initial awkwardness with the technology has been experienced in most distance education projects. Experience and training is required to enhance instructor ability in using the technology with skill and feeling comfortable expressing oneself when using the technology. High organizational skills are required by distance education instructors to coordinate the delivery of study materials and provide adequate pre-class time to allow for student preparation. Topics for in-service might include the following: the various uses of technological delivery vehicles; the characteristics of the distance learner; and, the techniques which enhance the distance learning experience for the student.

With the exception of correspondence programs, Saskatchewan can be viewed as a novice in this field despite the fact that substantial efforts have been made to promote the development of distance education in the province. Other provinces are more advanced because sophisticated computer, satellite television, and teleconference networks have already been established. British Columbia's Open Learning Authority (combining the Open Learning Institute and Knowledge Network), Alberta's Access and Athabasca University, Ontario's Ontario T.V. and Access North, to name but a few of the larger ones. It would be counter-productive for this province to hastily mirror these accomplishments since Saskatchewan has the distinct advantage of avoiding the mistakes, and learning from the successes of other province in the field of distance education.

Opportunities for the Future

If the post-secondary system is to respond as a system, and progress as a system, in distance education, it will need to put mechanisms in place which will permit new levels of sharing to occur. At a time of scarce resources, "wheel re-invention" will need to be eliminated; accurate needs assessments and both cost-benefit and quality assessment studies will need to be shared; co-ordination of in-province services and base knowledge on out-of-province programs will need to be greatly enhanced. Institutions will, in many respects, be "self-directed learners" in a new and challenging enterprise. **To facilitate this it is proposed that universities, institutes, colleges and the Department of Education work together through the newly announced Distance Education Council, which would: (a) make recommendations on, and react to, policies on distance education for Saskatchewan, and (b) act as an "operations clearinghouse" for the education and post-secondary systems in matters involving both federal and provincial liaison and in the collection and dissemination of evaluation, materials,etc.** The Council's mandate for operations would include developing long-term development plans; project evaluation systems and dissemination mechanisms; needs-assessment studies; cost- and quality- effectiveness studies; resource-sharing plans; and act as a forum to coordinate/stimulate transfer credit agreements and joint distance education marketing plans.

Resources of Council members will need to be shared and utilized through formal and informal agreements. An Interprovincial/Territorial Agreement in Western Canada makes sharing of materials possible at minimal costs (1984), the in-province sharing of materials and resources should be at least as open.

Proposals to the newly announced Education Outreach Fund should be considered by the Council and recommendations made through it to Saskatchewan Education and the Minister. Interest groups should expect this Council to be a single point of contact for the areas discussed earlier.

Joint university/institute/college distance education calendars and information need to be promoted by the Council to inform the public and ease concern on becoming involved in "high-tech" distance education.

Clear guidelines and criteria on needs and needs priorities should be established to permit the Council to manage student demand. If expectations outstrip resources, the burden on the post-secondary system will only have been increased.

Professional development training for faculty and instructors, administrators, counsellors and administrators needs to be promoted by the Council to ensure that quality is sustained and improved in the delivery side of distance education.

These are only a few of the more obvious questions and opportunities if the education system is to become a more active participant in distance education. In closing, it is proposed that the issue is no longer "if" it should become a more active participant, but "how". It is hoped that this paper will help stimulate answers to this critical question.

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APPENDIX A

UNIVERSITY OF REGINA CASE STUDY: FIBRE OPTICS 1985-86

Fibre

8 classes over Fall 1985 and Winter 1986 at 5 locations: Swift Current, Moose Jaw, Yorkton, Weyburn, Estevan, plus class on campus at origin.

Total enrolment = 420 part-time students

Operating Costs (accurate to 10%)

Fibre optic line rental	$ 82,800.00 per year
Telephone for students questions	8,000.00 per year
8 teachers (sessionals) (8 at $3,500.00)	28,000.00
1 Technician (student)	3,200.00
	$122,000.00
	+30%
	$158,600.00

Revenue

Tuition	420 x $141.00	$59,220.00
	Gross Cost	$99,000.00 divided by 48
	Net Classes - Section Cost	$2,062.50
	Per Student	$226.00

Traditional Itinerant Professor Compared

Cost

48 off-campus courses at $3,500.00 each	$168,000.00
Travel to 5 locations	30,000.00
	$198,000.00
	+30%
	$257,400.00

Revenue

Tuition	420 x $141.00	$ 59,220.00
	Gross Cost	$198,180.00
	Net Class Section Cost	$4,128.00
	Per Student	$471.86

Conclusion

Fibre Optics $2,070.00/section or $235.71/student

Itinerant Teacher $4,128.00/section or $471.86/student

Approximately 50% less cost with fibre optics.